

## CLAIMS:

1. A method of recording information to an optical recording medium to which information is recorded by projecting a pulse-modulated laser beam onto the optical recording medium and forming on the optical recording medium a plurality of recording marks selected from a group consisting of several types of recording marks each with different lengths, wherein: the method of recording information to an optical recording medium comprises a step of setting recording powers of a top pulse and/or a last pulse of a laser beam used for forming at least one recording mark contained within said group to a second recording power lower than a first recording power which is a recording power of an intermediate pulse(s) between the top pulse and the last pulse, thereby recording information in the optical recording medium.
2. A method of recording information to an optical recording medium in accordance with Claim 1, wherein the recording powers of the top pulse and the last pulse are set at the same level.
3. A method of recording information to an optical recording medium in accordance with Claim 1, wherein the first recording power  $Pw1$  and the second recording power  $Pw2$  are set so that  $Pw2/Pw1$  is smaller than 0.9.
4. A method of recording information to an optical recording medium in accordance with Claim 2, wherein the first recording power  $Pw1$  and the second recording power  $Pw2$  are set so that  $Pw2/Pw1$  is smaller than 0.9.
5. A method of recording information to an optical recording medium in accordance with Claim 1, wherein a pulse width of a cooling pulse of the laser beam used for forming at least one recording mark contained within said

group is set to wider than that of any pulse of the recording power.

6. A method of recording information to an optical recording medium in accordance with Claim 2, wherein a pulse width of a cooling pulse of the laser  
5 beam used for forming at least one recording mark contained within said group is set to wider than that of any pulse of the recording power.

7. A method of recording information to an optical recording medium in accordance with Claim 3, wherein a pulse width of a cooling pulse of the laser  
10 beam used for forming at least one recording mark contained within said group is set to wider than that of any pulse of the recording power.

8. A method of recording information to an optical recording medium in accordance with Claim 4, wherein a pulse width of a cooling pulse of the laser  
15 beam used for forming at least one recording mark contained within said group is set to wider than that of any pulse of the recording power.

9. A method of recording information to an optical recording medium in accordance with Claim 8, wherein the pulse width of the cooling pulse is set to  
20 be equal to or wider than 1.0 T.

10. A method of recording information to an optical recording medium in accordance with Claim 9, wherein a length of a shortest signal between neighboring recording marks is equal to or shorter than 30 ns.

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11. A method of recording information to an optical recording medium in accordance with Claim 10, wherein the length of the shortest signal between neighboring recording marks is equal to or shorter than 20 ns.

12. An optical recording medium comprising at least a recording layer to which information is recorded by projecting a pulse-modulated laser beam thereonto and forming thereon a plurality of recording marks selected from a group consisting of several types of recording marks each with different lengths, wherein: the optical recording medium comprises information required to set recording powers of a top pulse and/or a last pulse of a laser beam used for forming at least one recording mark contained within said group to a second recording power lower than a first recording power which is a recording power of an intermediate pulse(s) between the top pulse and the last pulse and record the information therein.

13. An optical recording medium in accordance with Claim 12, which further comprises information required to set the recording powers of the top pulse and the last pulse at the same level and record the information therein.

14. An optical recording medium in accordance with Claim 12, which further comprises information required to set the first recording power  $Pw1$  and the second recording power  $Pw2$  so that  $Pw2/Pw1$  is smaller than 0.9.

15. An optical recording medium in accordance with Claim 13, which further comprises information required to set the first recording power  $Pw1$  and the second recording power  $Pw2$  so that  $Pw2/Pw1$  is smaller than 0.9.

16. An information recording and reproducing apparatus that records information by projecting a pulse-modulated laser beam onto an optical recording medium and forming on the optical recording medium a plurality of recording marks selected from a group consisting of several types of recording

marks each with different lengths, thereby recording information in the optical recording medium wherein: the information recording and reproducing apparatus comprises at least optical means for projecting the laser beam onto the optical recording medium and laser drive means for supplying a laser drive  
5 signal for controlling the laser beam, the laser drive means being adapted to supply a laser drive signal to set recording powers of a top pulse and/or a last pulse of a laser beam used for forming at least one recording mark contained within said group to a second recording power lower than a first recording power which is a recording power of an intermediate pulse(s) between the top  
10 pulse and the last pulse.

17. An information recording and reproducing apparatus in accordance with Claim 16, wherein the recording powers of the top pulse and the last pulse are set at the same level.

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18. An information recording and reproducing apparatus in accordance with Claim 16, wherein the first recording power  $Pw1$  and the second recording power  $Pw2$  are set so that  $Pw2/Pw1$  is smaller than 0.9.

20 19. An information recording and reproducing apparatus in accordance with Claim 17, wherein the first recording power  $Pw1$  and the second recording power  $Pw2$  are set so that  $Pw2/Pw1$  is smaller than 0.9.

## ABSTRACT OF THE DISCLOSURE

The present invention relates to a method of recording information to an optical recording medium that can reduce the influence from heat caused when neighboring recording marks are formed and can prevent cross-talk and cross-erase of information. According to the present invention, when forming recording marks in the optical recording medium by projecting a pulse-modulated laser beam thereonto, since the recording powers of a top pulse and a last pulse are set to  $Pw2$  lower than the recording power  $Pw1$  of any of intermediate pulses and the width  $T_{cl}$  of a cooling pulse is set to be equal to or wider than  $1.0T$  wider than the width of a pulse of the recording power, it is possible to improve cooling efficiency when recording marks are formed, thereby decreasing thermal interference between recording marks and achieve high density recording and high data transfer rate.